

Optimization of Ethylene Concentration and Exposure Time to Enhance the Ripening Rate of Avocado Fruits

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Delay in ripening of mature avocado fruits results in excessive weight loss, increasing diseases incidences, desiccating and showing uneven ripening. Application of ethylene gas has been used to enhance the ripening rate of avocado fruits. However, ethylene concentration and exposure time duration have not yet been optimized. This study was conducted to optimize the ethylene concentration (experiment one) and exposure time (experiment two), respectively to enhance the ripening rate of avocado fruits using ethrel which is an ethephon source. In the experiment one, avocado fruits (75) were treated with ethrel using three different concentrations (200, 300 and 400 ppm) in a hermetically sealed chamber at ambient conditions while water was used as control. In the second experiment, avocado fruits (75) were exposed to selected ethylene gas treatments from the experiment one for three different time periods 12, 18 and 24 h. Physicochemical properties such as weight loss, peel color, total soluble solid and firmness were examined at two days interval. This experiment was conducted using complete randomized design in triplicates and data were analyzed with one way ANOVA. According to the experiment 01, sample treated with 400 ppm of ethrel reached the table ripe stage three days after storage and showed significantly ($p < 0.05$) higher lightness, redness (+) to green (-) and yellowness (+) to blueness (-) value of peel color (49.06 ± 1.97 , -13.98 ± 1.87 and 34.90 ± 3.99 respectively), Total soluble solids (11.07 ± 1.60 °Brix), physiological weight loss (7.10 ± 0.34 %) and lowest firmness retention (2.17 ± 1.30 N) than control sample. According to the experiment 02, sample exposed to 400 ppm of ethrel for 24 h reached the table ripe stage after three days of storage and showed significantly ($P < 0.05$) higher L^* , a^* and b^* value of peel color (47.11 ± 0.80 , -17.91 ± 1.72 and 30.59 ± 2.09 respectively), TSS (11.23 ± 0.75 °Brix), physiological weight loss (7.81 ± 0.80 %) and lowest firmness retention (1.19 ± 0.40 N) than control sample. Hence, exposing avocado fruits to 400 ppm ethrel for 24 h can be recommended for enhancing ripening.

Keywords: Avocado, Ethrel, Ethylene gas, Ripening, Quality